

ND-R143 405

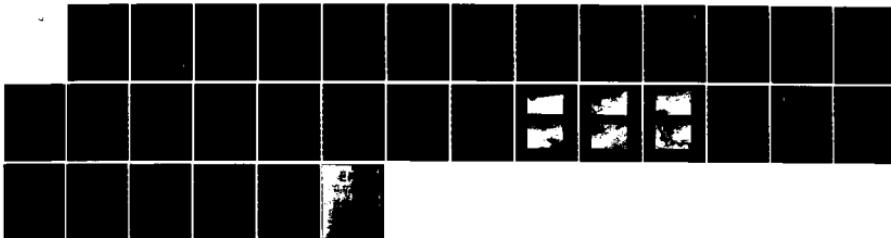
NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS  
UPPER MILL POND DAM (..(U) CORPS OF ENGINEERS WALTHAM  
MA NEW ENGLAND DIV JAN 81

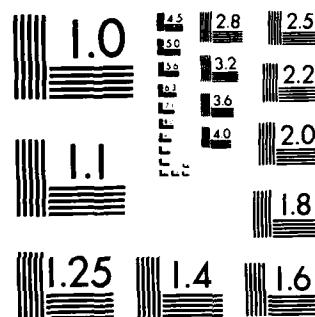
2/2

UNCLASSIFIED

F/G 13/13

NL





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

DTIC FILE COPY

AD-A143 405

CONNECTICUT RIVER BASIN  
MIDDLETOWN, CONNECTICUT

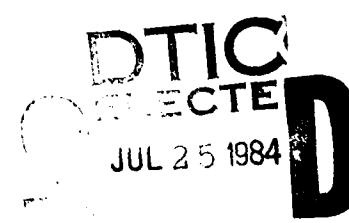
UPPER MILL POND DAM

CT 00141

DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION  
CORPS OF ENGINEERS  
WALTHAM, MASSACHUSETTS

January, 1981

This document contains neither recommendations nor conclusions of the Defense Technical Information Center. The content reflects the views of the author(s). It is the property of DTIC and is loaned to your agency; its distribution is unrestricted.



84 07 23 047

**UNCLASSIFIED**

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

<b>REPORT DOCUMENTATION PAGE</b>		<b>READ INSTRUCTIONS BEFORE COMPLETING FORM</b>
1. REPORT NUMBER CT 00141	2. GOVT ACCESSION NO. <i>An-A143 405</i>	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle)  Upper Mill Pond Dam	5. TYPE OF REPORT & PERIOD COVERED  INSPECTION REPORT	
NATIONAL PROGRAM FOR INSPECTION OF NON-FEDERAL DAMS		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)  U.S. ARMY CORPS OF ENGINEERS NEW ENGLAND DIVISION	8. CONTRACT OR GRANT NUMBER(s)	
9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS	
11. CONTROLLING OFFICE NAME AND ADDRESS  DEPT. OF THE ARMY, CORPS OF ENGINEERS NEW ENGLAND DIVISION, NEDED 424 TRAPELO ROAD, WALTHAM, MA. 02254	12. REPORT DATE  January, 1981	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)	13. NUMBER OF PAGES  25	
	15. SECURITY CLASS. (of this report)  UNCLASSIFIED	
	16a. DECLASSIFICATION/DOWNGRADING SCHEDULE	
16. DISTRIBUTION STATEMENT (of this Report)  APPROVAL FOR PUBLIC RELEASE: DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES  Cover program reads: Phase I Inspection Report, National Dam Inspection Program; however, the official title of the program is: National Program for Inspection of Non-Federal Dams; use cover date for date of report.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  DAMS, INSPECTION, DAM SAFETY, Conn. River Basin Middletwon, Conn. Upper Mill Pond Dam		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  UPper Mill Pond Dam is a stone masonry dam approx. 100 ft. long and 15 ft. high. The spillway is 92 ft. long, 9 ft. wide and consists of a masonry broad crested weir. The overall condition of the dam is FAIR. The structural stability of the dam is good as evidenced by its vertical, horizontal and lateral alignment.		

# STORCH ENGINEERS

161 MAIN STREET, WETHERSFIELD, CONNECTICUT 06109

(203) 529-7727

January 28, 1981

Mr. E. P. Gould  
Department of the Army  
New England Division  
Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts 02154

Subject: Dam Inspection Program  
Upper Mill Pond Dam  
Middletown, Connecticut

Dear Mr. Gould:

Following the field inspection and hydraulic/hydrologic analysis of the subject dam, we conclude that the dam should be reclassified as having a LOW hazard potential.

Please find attached a brief report substantiating our findings.

Very truly yours,

STORCH ENGINEERS

*Gary J. Giroux*  
Gary J. Giroux, P.E.

Accession For	
NTIS	CR&I
PSIC	TAP
Unpublished	
J. Classification	
By	
Date	
Classification Codes	
Distribution Codes	
Distr. by Function or	
Distr.	Serial
A-1	



GJG:11  
Attachment

FLORHAM PARK  
NEW JERSEY

WETHERSFIELD  
CONNECTICUT

BOSTON  
MASSACHUSETTS

HEMPSTEAD  
NEW YORK

UPPER MILL POND DAM

CT 00141

CONNECTICUT RIVER BASIN  
MIDDLETOWN, CONNECTICUT

PHASE I INSPECTION REPORT  
NATIONAL DAM INSPECTION PROGRAM

## TABLE OF CONTENTS

	<u>Page</u>
Description . . . . .	1
Evaluation of Hydraulic/Hydrologic Features . . . . .	2
Location Plan	
Appendices	
Appendix A - Inspection Check List	
Appendix B - Engineering Data	
Appendix C - Photographs	
Appendix D - Hydraulic/Hydrologic Computations	
Appendix E - Inventory Form	

## NATIONAL DAM INSPECTION PROGRAM

### PHASE I INSPECTION REPORT

Identification Number: CT 00141  
Name: Upper Mill Pond Dam  
Town: Middletown  
County and State: Middlesex County, Connecticut  
Stream: Sumner Brook  
Date of Inspection: October 22, 1980  
Owner/Operator: Fenner America LTD.  
400 East Main Street  
Middletown, Connecticut 06457

#### DESCRIPTION

Upper Mill Pond Dam is a stone masonry dam approximately 100 feet long and 15 feet high. The spillway is 92 feet long, 9 feet wide and consists of a masonry broad crested weir. The west abutment is a 3-foot high concrete wall and the east abutment is a 1-foot high irregularly shaped concrete platform. A concrete outlet structure with a bar rack is at the edge of the pond adjacent to the east abutment. A 12-inch low-level discharge pipe passes through the dam below the east abutment at 7.5 feet above the toe of the dam. Plan, section and elevation views of the dam are contained in Appendix B.

Upper Mill Pond Dam was constructed around 1900 and was originally used to supply power to the downstream mill. Today, the dam is used for recreational purposes only. The water level is at the spillway crest and can be lowered by opening the low-level discharge gate which was recently made operable by the Middletown Water Department. No specific maintenance program exists for this dam. No design or construction information is available for the dam.

In general, the overall condition of the dam is FAIR. A copy of the visual inspection check list and selected photos are contained in Appendix A and C respectively. The structural stability of the dam is good as evidenced by its vertical, horizontal and lateral alignment. The stone masonry is in good condition although

moss and weeds are growing from the joints. The spillway weir and east abutment are in good condition. The west abutment is badly spalled at its base. The discharge gate inlet structure is badly spalled and the bar rack is cluttered with debris. There is some seepage at the east end of the dam where the stone masonry meets the abutment/ledge interface. Vegetation is growing around this area as well. The ledge continues along the downstream channel bank and there is minor seepage.

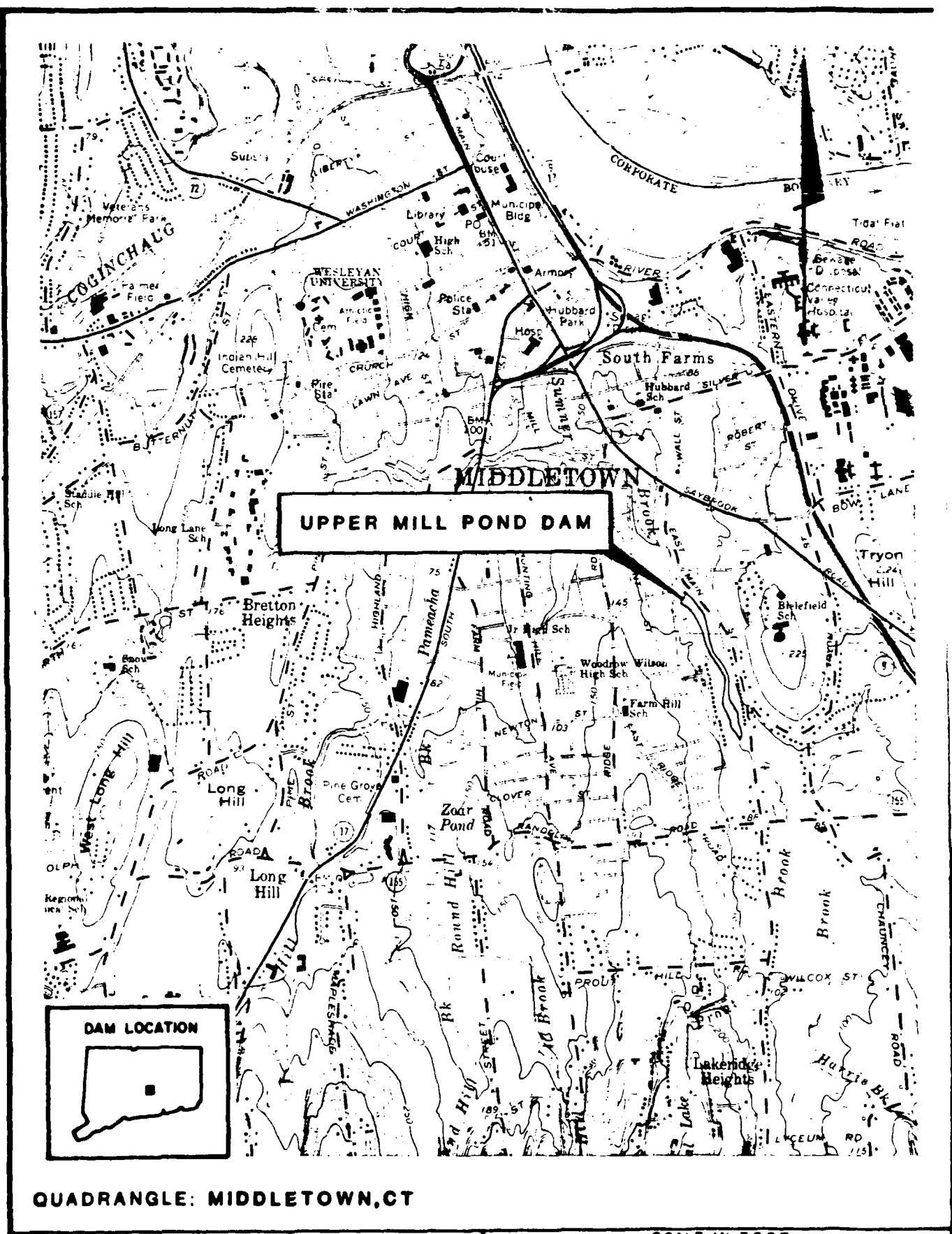
A drainage pipe outlets above the west abutment. There is presently a scour hole at this location. This scour hole has caused the last section of the drainage pipe to collapse into the hole and is undermining the west spillway abutment.

#### EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

The watershed of Upper Mill Pond Dam encompasses 7.6 square miles of rolling topography that is 25 percent developed. At the spillway elevation, the water surface area and storage capacity is 5 acres and 31 acre-feet respectively. The storage capacity when the water level is at the top of the dam is 36 acre-feet. With a maximum height of 15 feet and a maximum storage capacity of 36 acre-feet, Upper Mill Pond Dam is classified as SMALL in accordance with the Corps of Engineers' Recommend Guidelines for Safety Inspection of Dams.

A dam failure analysis was performed using the Rule of Thumb method in accordance with guidelines established by the Corps of Engineers. Failure was assumed to occur when the water level in the pond was at the top of the dam. The calculated dam failure discharge is 3,610 cfs. The flood waters were routed through the downstream reaches. Nowhere along the river reach will the failure floodwave endanger human life or cause appreciable property damage. Therefore, the dam is classified as LOW hazard potential in accordance with the guidelines mentioned above.

The test flood for this dam ranges from the 50 year flood to the 100 year flood, with the 50 year flood being used because the dam's small size. The test flood inflow is 1,250 cfs and the routed test flood outflow is 1,200 cfs. The spillway capacity when the water level in the pond is at the top of the dam is 250 cfs. The test flood will overtop the dam by 1.8 feet. Hydraulic and hydrologic computations are contained in Appendix D.



US ARMY, CORPS OF ENGINEERS  
NEW ENGLAND DIVISION  
WALTHAM, MASS.

SCALE IN FEET  
2000' 0 2000' 4000'  
1" = 2000'

LOCATION MAP

**APPENDIX A**  
**INSPECTION CHECK LIST**

## INSPECTION CHECK LIST

## PARTY ORGANIZATION

PROJECT Upper Mill Pond DamDATE 10/22/80TIME 9:30 a.m.WEATHER Sunny, 50'sW.S. ELEV.        U.S.        DN.S.       PARTY:

1. <u>Gary Giroux, S.E., Hyd./Struct.</u>	6. <u>Mich<sup>a</sup></u> <u>Pozzato, MA, Mechanical</u>
2. <u>Hermann Hani, S.E., Technician</u>	7. <u>      </u> <u>      </u>
3. <u>Ben Cohen, S.E., Civil</u>	8. <u>      </u> <u>      </u>
4. <u>Floyd Austin, DBA, Civil</u>	9. <u>      </u> <u>      </u>
5. <u>Peter Austin, DBA, Civil</u>	10. <u>      </u> <u>      </u>

PROJECT FEATURE	INSPECTED BY	REMARKS
1. <u>Dam Embankment</u>	F. Austin P. Austin	Fair
2. <u>Mechanical</u>	M. Pozzato	Fair
3. <u>Spillway</u>	G. Giroux B. Cohen	Good
4. <u>Discharge Channel</u>	G. Giroux H. Hani	Good
5. <u>      </u>		
6. <u>      </u>		
7. <u>      </u>		
8. <u>      </u>		
9. <u>      </u>		
10. <u>      </u>		

## INSPECTION CHECK LIST

PROJECT Upper Mill Pond DamDATE 10/22/80

PROJECT FEATURE \_\_\_\_\_

NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_

NAME \_\_\_\_\_

AREA EVALUATED	CONDITIONS
<u>DAM EMBANKMENT</u>	
Crest Elevation	75 (NGVD)
Current Pool Elevation	74.1 (NGVD)
Maximum Impoundment to Date	Unknown
Surface Cracks	None (masonry dam)
Pavement Condition	N/A
Movement or Settlement of Crest	None
Lateral Movement	None
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Concrete spalled at west abutment
Indications of Movement of Structural Items on Slopes	None
Trespassing on Slopes	Some
Vegetation on Slopes	Brush and small trees
Sloughing or Erosion of Slopes or Abutments	Some near west abutment and along east bank of downstream channel
Rock Slope Protection - Riprap Failures	N/A
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	Substantial at east embankment
Piping or Boils	None
Foundation Drainage Features	None
Toe Drains	None
Instrumentation System	None

## INSPECTION CHECK LIST

PROJECT Upper Mill Pond DamDATE 10/22/80

PROJECT FEATURE \_\_\_\_\_

NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_

NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>CUTLET WORKS - INTAKE CHANNEL AND INTAKE STRUCTURE</u>	
a. Approach Channel	Underwater
Slope Conditions	
Bottom Conditions	
Rock Slides or Falls	
Log Boom	
Debris	
Condition of Concrete Lining	
Drains or Weep Holes	
b. Intake Structure	
Condition of Concrete	Fair - significant spalling
Stop Logs and Slots	Bar rack clogged with debris

## INSPECTION CHECK LIST

PROJECT Upper Mill Pond DamDATE 10/22/80

PROJECT FEATURE \_\_\_\_\_

NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_

NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - CONTROL TOWER</u>	
a. Concrete and Structural	N/A
General Condition	
Condition of Joints	
Spalling	
Visible Reinforcing	
Rusting or Staining of Concrete	
Any Seepage or Efflorescence	
Joint Alignment	
Unusual Seepage or Leaks in Gate Chamber	
Cracks	
Rusting or Corrosion of Steel	
b. Mechanical and Electrical	
Air Vents	
Float Wells	
Crane Hoist	
Elevator	
Hydraulic System	
Service Gates	Operable
Emergency Gates	
Lightning Protection System	
Emergency Power System	
Wiring and Lighting System Gate Chamber	

## INSPECTION CHECK LIST

PROJECT Upper Mill Pond DamDATE 10/22/80

PROJECT FEATURE \_\_\_\_\_

NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_

NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - TRANSITION AND CONDUIT</u>  General Condition of Concrete Rust or Staining on Concrete Spalling Erosion or Cavitation Cracking Alignment of Monoliths Alignment of Joints Numbering of Monoliths	N/A

## INSPECTION CHECK LIST

PROJECT Upper Mill Pond DamDATE 10/22/80

PROJECT FEATURE \_\_\_\_\_

NAME \_\_\_\_\_

DISCIPLINE \_\_\_\_\_

NAME \_\_\_\_\_

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS</u>	
a. Approach Channel	
General Condition	Unknown - underwater
Loose Rock Overhanging Channel	None
Trees Overhanging Channel	Some small trees
Floor of Approach Channel	Underwater
b. Weir and Training Walls	
General Condition of Concrete	Poor at west abutment. Good at east abutment
Rust or Staining	None
Spalling	Significant spalling at west abutment
Any Visible Reinforcing	None
Any Seepage or Efflorescence	Some at east abutment
Drain Holes	None
c. Discharge Channel	
General Condition	Good
Loose Rock Overhanging Channel	Ledge on east bank severely undermined
Trees Overhanging Channel	Some small trees
Floor of Channel	Large rocks, bedrock some brush
Other Obstructions	

**INSPECTION CHECK LIST**

**PROJECT**      Upper Mill Pond Dam

**DATE** 10/22/80

## **PROJECT FEATURE**

## **NAME**

## **DISCIPLINE**

**NAME**

AREA EVALUATED	CONDITION
<u>OUTLET WORKS - OUTLET STRUCTURE AND</u>	
<u>OUTLET CHANNEL</u>	N/A
General Condition of Concrete	
Rust or Staining	
Spalling	
Erosion or Cavitation	
Visible Reinforcing	
Any Seepage or Efflorescence	
Condition at Joints	
Drain holes	
Channel	Outlet pipe discharge into spillway channel
Loose Rock or Trees Overhanging	
Channel	
Condition of Discharge Channel	

**APPENDIX B**  
**ENGINEERING DATA**

**Any information pertaining to the history, maintenance and past inspection  
reports are located at:**

**State of Connecticut  
Department of Environmental  
Protection  
Water Resources Unit  
State Office Building  
Hartford, Connecticut 06115**

**APPENDIX C**  
**PHOTOGRAPHS**



UPPER MILL POND DAM



WEST ABUTMENT



SPILLWAY - EAST ABUTMENT



TRAINING WALL - WEST ABUTMENT



TRAINING WALL - WEST ABUTMENT - DRAINAGE PIPE



DOWNSTREAM CHANNEL

APPENDIX D  
HYDRAULIC/HYDROLOGIC COMPUTATIONS

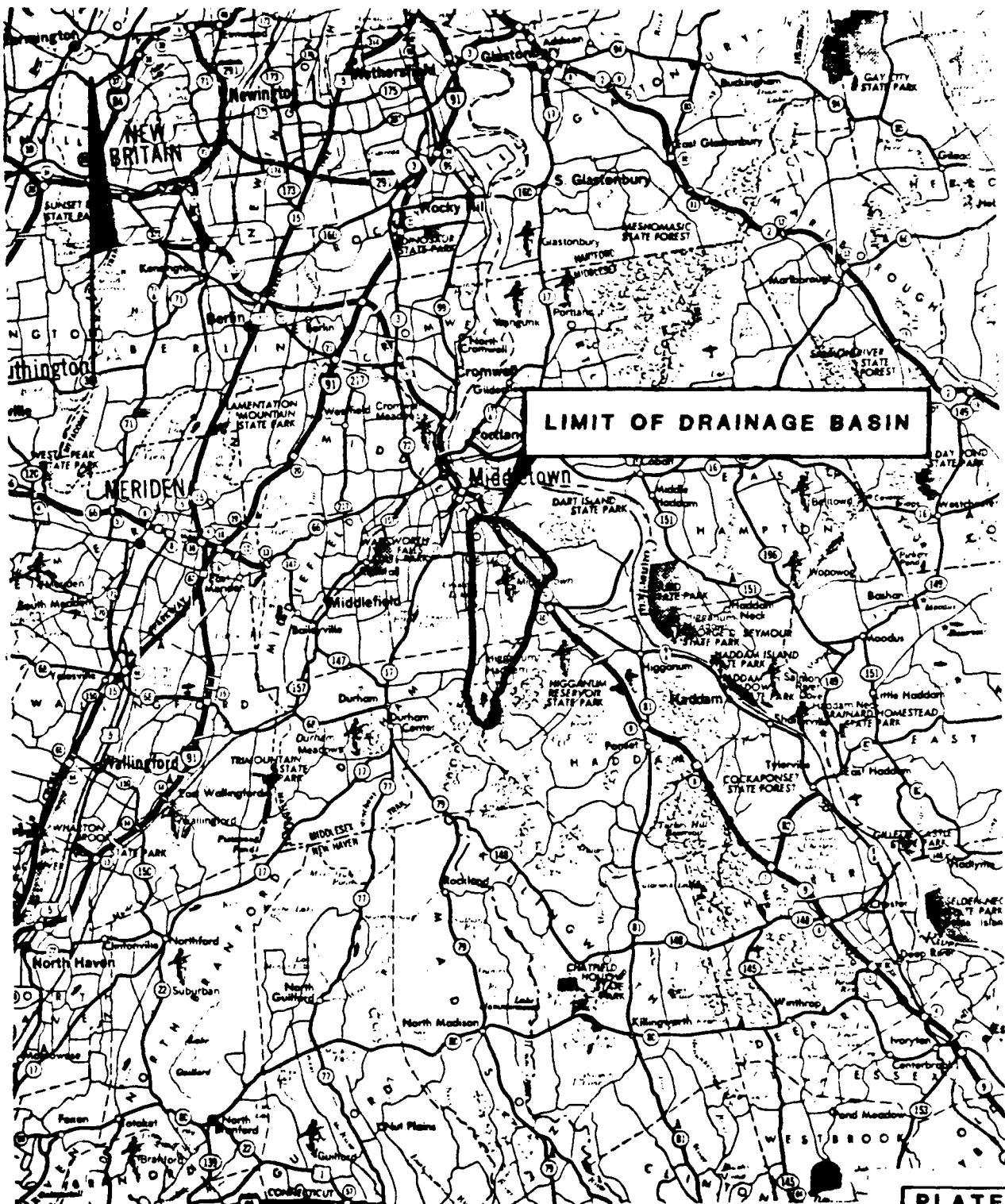


PLATE 2

STORCH ENGINEERS  
WETHERSFIELD, CONNECTICUT

U.S. ARMY ENGINEER DIV NEW ENGLAND  
CORPS OF ENGINEERS  
WALTHAM MASS.

NATIONAL PROGRAM OF INSPECTION OF NON-FED DAMS

**UPPER MILL POND DAM**

1 in. = 3.6 mi.

SCALE AS SHOWN

DATE JANUARY, 1981

**STORCH ENGINEERS**  
 Engineers - Landscape Architects  
 Planners - Environmental Consultants

JOB Phase I Dam Inspection - #4463

SHEET NO. 1 OF 5

CALCULATED BY EDC DATE 1/9/81

CHECKED BY 7-6 DATE 1/17/81

**Determination of Test Flood**

NAME OF DAM Upper Mill Pond Dam

DRAINAGE AREA 7.6 SM

INFLOW Size: Sno 11

Hazard: Low

Test Flood: 50 year

$$Q = 252 A^{.79}$$

$$Q = 252 (7.6)^{.79} = 1250 \text{ cfs}$$

**Estimating the effect of surcharge storage on the Maximum Test Flood**

1.  $Q_{P1} = 1250 \text{ cfs}$

2a.  $H_1 = 2.9' \text{ (elev.)}$

b.  $STOR_1 = 0.18''$

c.  $Q_{P2} = Q_{P1} (1 - STOR_1/4.4) = 1200 \text{ cfs}$

3a.  $H_2 = 2.8' \quad STOR_2 = .17''$

b.  $STOR_A = .175''$

$Q_{PA} = 1200 \text{ cfs}$

$H_A = 2.8' \quad STOR_A = .17''$

Test Flood = 1200 cfs

Capacity of the spillway when the pond elevation is at the top of the dam

$Q = 250 \text{ cfs or } 21\% \text{ of the Test Flood}$

**TORCH ENGINEERS**  
 Engineers - Landscape Architects  
 Planners - Environmental Consultants

JOB Phase I Dam Inspection 4463

SHEET NO 2 OF 5

CALCULATED BY RDC DATE 11/24/80

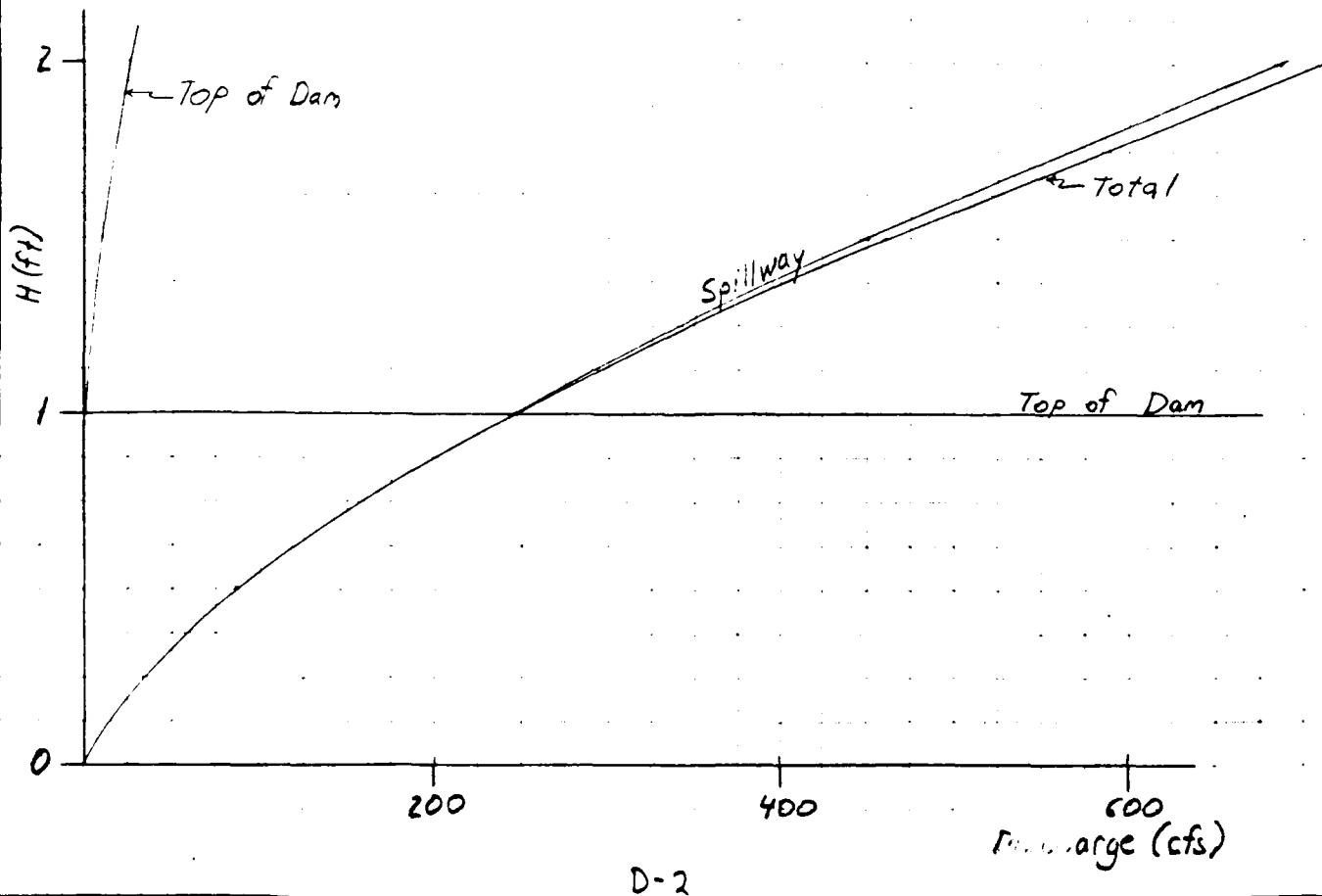
CHECKED BY G.J.C. DATE 11/4/81

Stage Discharge

NAME OF DAM Upper Mill Pond Dam

$$Q = CLH^{3/2}$$

Elev	Spillway I				Spillway II				Dam				QT
	C	L	H	Q	C	L	H	Q	C	L	H	Q	
		92'	0	0									0
2.63		0.5	86										86
2.62		1.0	247										247
2.66		1.5	450										460
2.64	↓	2.0	687										713



D-2

**STORCH ENGINEERS**  
 Engineers - Landscape Architects  
 Planners - Environmental Consultants

JOB Phase I Dam Inspection 4463

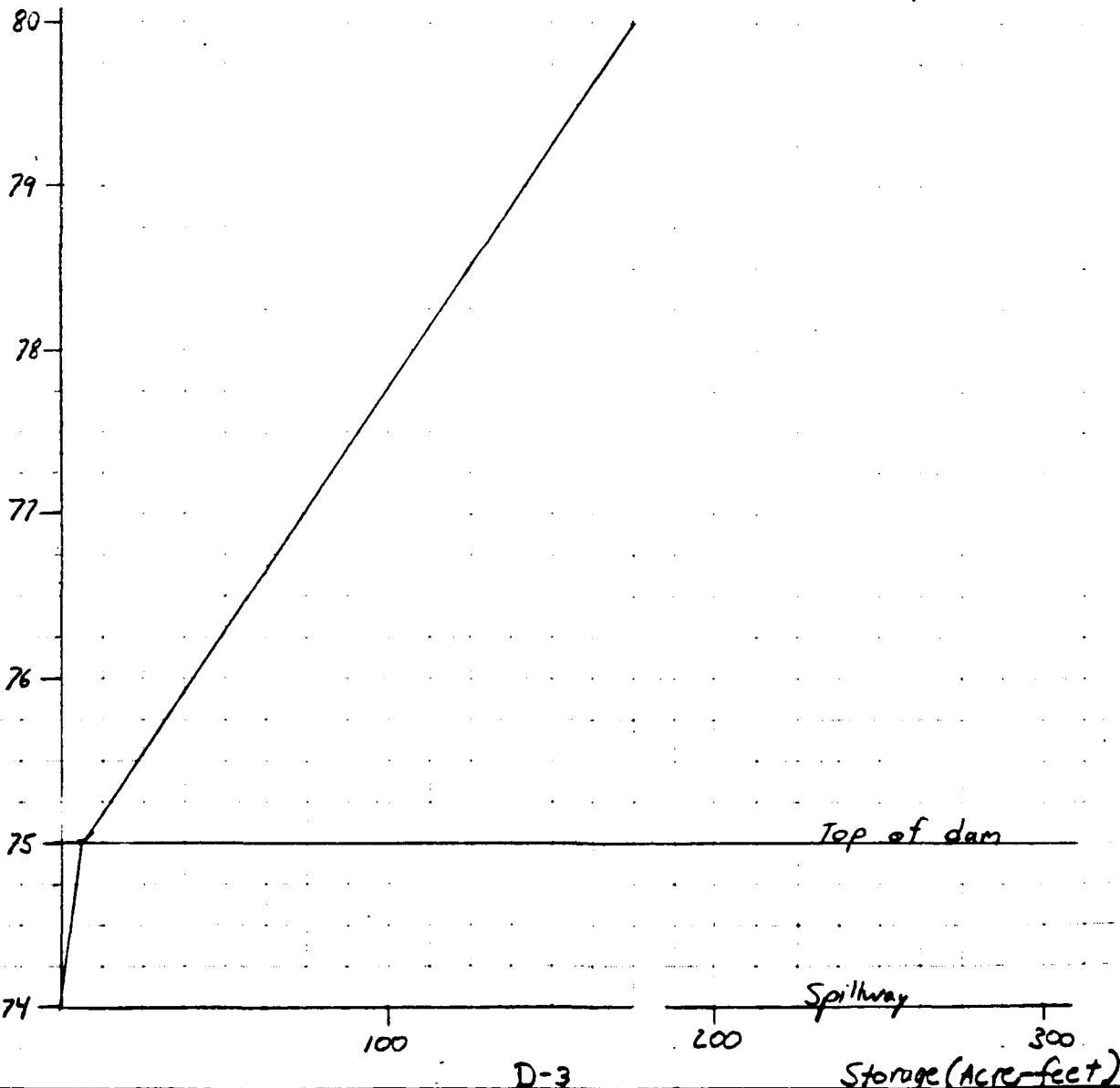
SHEET NO 3 OF 5  
 CALCULATED BY RDS DATE 1/9/81  
 CHECKED BY G.L.G. DATE 1/15/81

AREA - CAPACITY

Name of Dam: Upper Mill Pond Dam

ELEV	DEPTH	AREA	AVG. AREA	VOL	$\Sigma$ VOL
74		4.7			
	1.0		7.8	4.8	
75		4.9			4.8
	5.0		34.2	171.0	
80		63.4			175.8

Elev. (NGVD) Storage below spillway is approximately 31 Acre



**STORCH ENGINEERS**  
Engineers - Landscape Architects  
Planners - Environmental Consultants

Phase I Dam Inspection - #4463

JOB 41 OF 5  
SHEET NO. 41 OF 5  
CALCULATED BY RDC DATE 12/5/80  
CHECKED BY GJG DATE 1/12/81

Downstream Hydrographs

"Rule of Thumb" Guidance for Estimating Downstream Failure Hydrographs

NAME OF DAM Upper Mill Sons' Dam

Section I at Dam

$$1. S = \frac{36}{8/27 H_b \sqrt{g}} \text{ Acft}$$

$$2. Q_{P1} = \frac{36}{8/27} (37) \sqrt{32.2} (15)^{1.5} = 3,610 \text{ cfs}$$

3. See Sections

Section II at

$$4a. H_2 = \underline{8.9'} \quad A_2 = \underline{510} \quad L_2 = \underline{190} \quad V_2 = \underline{2.2} \text{ Acft}$$

$$b. Q_{P2} = Q_{P1} (1-V_2/S) = \underline{3,390} \text{ cfs}$$

$$c. H_2 = \underline{8.6'} \quad A_2 = \underline{490} \quad A_A = \underline{500} \quad V_2 = \underline{2.2} \text{ Acft}$$

$$Q_{P2} = 3,610 (1 - 2.2/36) = 3,390 \text{ cfs} \quad H = 8.6'$$

Section III at

$$4a. H_3 = \underline{8.6'} \quad A_3 = \underline{490} \quad L_3 = \underline{80} \quad V_3 = \underline{0.9} \text{ Acft}$$

$$b. Q_{P3} = Q_{P2} (1-V_3/S) = \underline{3,305} \text{ cfs}$$

$$c. H_3 = \underline{8.5'} \quad A_3 = \underline{470} \quad A_A = \underline{480} \quad V_3 = \underline{0.9} \text{ Acft}$$

$$Q_{P3} = 3,390 (1 - 0.9/36) = 3,305 \text{ cfs} \quad H = 8.5'$$

Section IV at

$$4a. H_4 = \underline{\quad} \quad A_4 = \underline{\quad} \quad L_4 = \underline{\quad} \quad V_4 = \underline{\quad} \text{ Acft}$$

$$b. Q_{P4} = Q_{P3} (1-V_4/S) = \underline{\quad} \text{ cfs}$$

$$c. H_4 = \underline{\quad} \quad A_4 = \underline{\quad} \quad A_A = \underline{\quad} \quad V_4 = \underline{\quad} \text{ Acft}$$

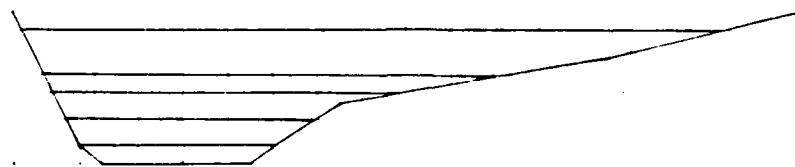
$$Q_{P4} = \underline{\quad}$$

**STORCH ENGINEERS - STORCH ASSOCIATES**  
 Engineers - Landscape architects  
 Planners - Environmental Consultants

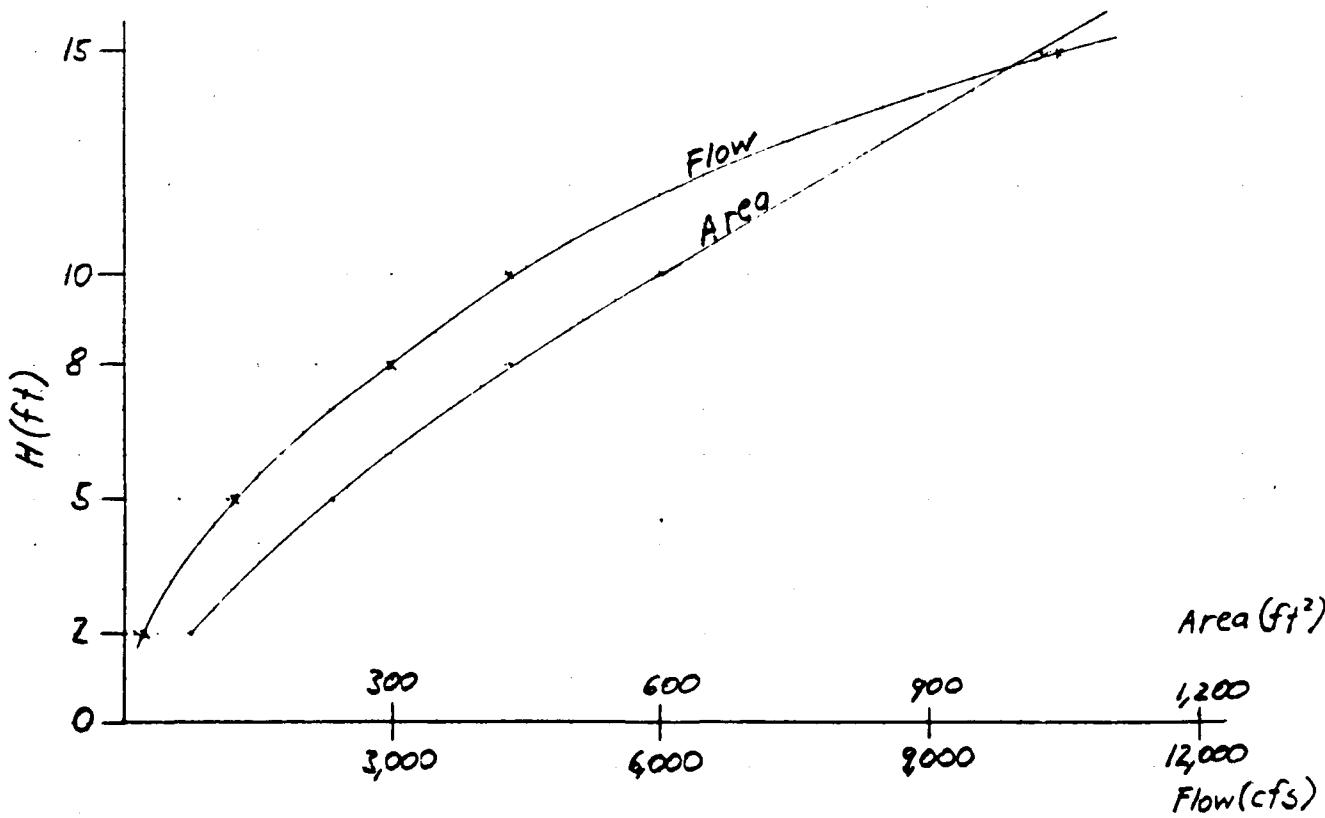
JOB Upper L SHEET NO 5 OF 5  
 CALCULATED BY CPC DATE 11/21/20  
 CHECKED BY SAC DATE 11/21/20  
 SCALE SECTION II, E

$$S = 1.14\% \\ n = 0.075$$

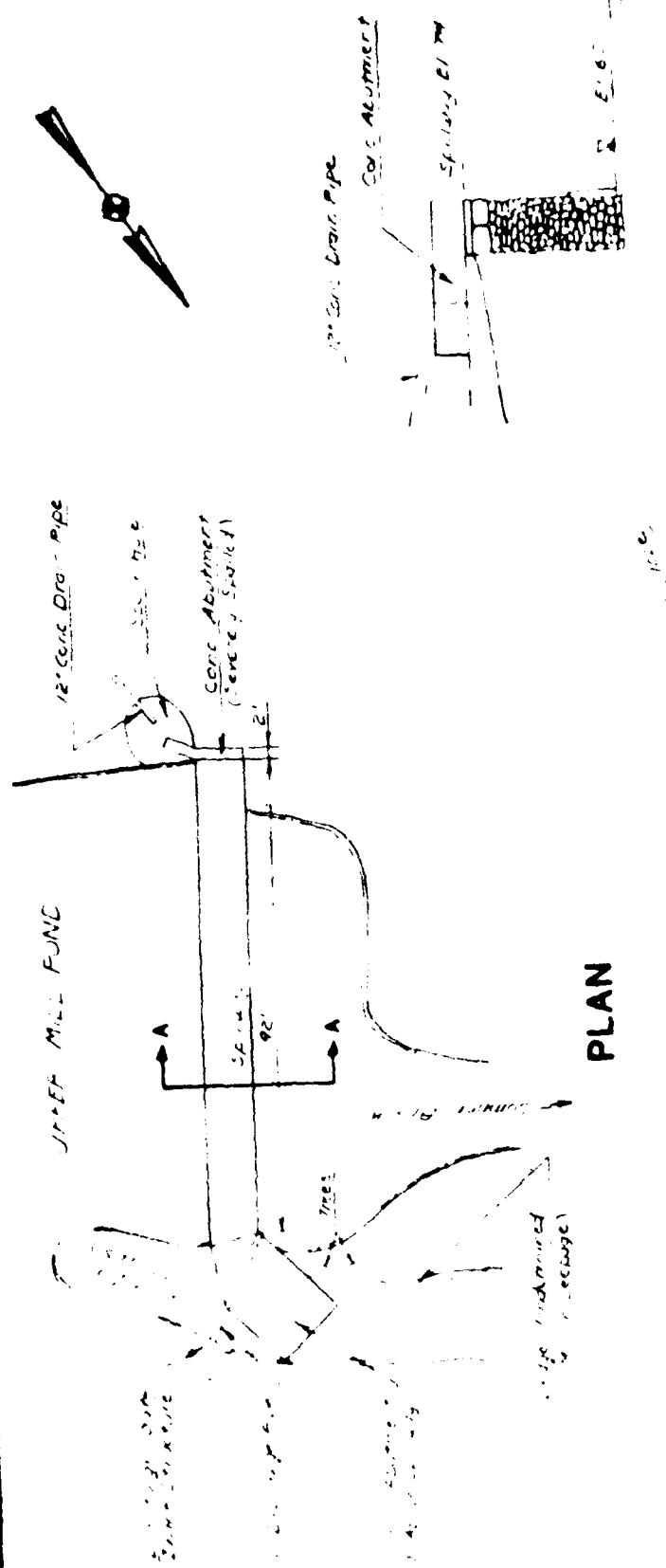
5' ↑  
10'



D	WP	A	R	$R^{2/3}$	$S^{1/2}$	V	Q
2	44	77	1.75	1.45	0.107	3.08	237
5	60	233	3.82	2.47	"	5.24	1,221
8	73	433	5.93	3.28	"	6.95	3,010
10	97	603	6.22	3.38	"	7.17	4,324
15	154	1,231	7.99	4.00	"	8.48	10,439



D-5



### SECTION A-A

NOTES ON LOCAL

LEADER

**PLATE 1**

STRENGTHENING AND  
INSPECTION OF  
NATIONAL PROGRAM IN INSPECTION OF NON-FEDERAL  
DAMS

UPPER MILL POND DAM

SCALE AS SHOWN

DATE ISSUED: 10/01

END

FILMED